

We claim:

CLAIMS

1. A method for the robust determination and recovering from general affine transformations, or any other defined parametric class of geometrical transformations, applied to data Y wherein said data contains a set of points or structured pattern supposed to follow an underlying regular grid, comprising the steps of:

- (a) detecting these points in some domain;
- (b) representing the detected points by their cartesian coordinates and possibly keeping also their values;
- (c) calculating the parametric or the projective transform matched with the defined geometry of the points resulting in the corresponding maxima, for the specified geometry of points, and exploiting the redundancy in points, to extract the needed significant features from these maxima;
- (d) estimating the parameters of the possibly applied transformation from the class of affine transformations, or any other defined class, using information from (b) and (c);
- (e) recovering of the applied transformation using the parameters estimated in (d);

whereby said estimating of geometrical transformation assists in the recovering from global image

alterations whereby said Y containing a hidden set of points can be visually undistinguishable from the original data X .

2. The method of claim 1 wherein said parametric or projective transform uses Hough transform (HT), Radon transform (RT), any generalized version of these transforms, or any other parametric or projective transform.
3. The method of claim 1 wherein said regular grid corresponds to significant local maxima or peaks of the auto-correlation function (ACF), or of the magnitude spectrum (MS) associated with an embedded periodic pattern, also possibly containing a multi-bit message, or any "appropriate function" of a "periodical watermark" or of a watermark with some regularity.
4. The method of claim 1 wherein said grid corresponds to any modified pattern of plurality of points of a geometrically structured pattern which in the matched parameter-space projection guarantees the existence of distinguishable maxima.
5. The method of claims 1, 3 or 4 wherein said grid or pattern possibly is perceptually invisible and embedded using any kind of perceptual masking.
6. The method of claim 1 wherein said set of points is key-based globally transformed before combining it with said data X whereby said Y can be visually undistinguishable from said X .

7. The method of claim 1 wherein said set of points is transformed to match image features in coordinates domain, or in any transformed domain.
8. The method of claim 1 wherein said parametric or projective transform is used to estimate the parameters of the applied global affine transformation using said robust estimation of rotational angle and robust estimation of said periods from the distorted set of points.
9. The method of claim 1 applied to video data, wherein a said structured or periodic pattern is used within any number of frames, in the plurality of frames along the time axis.
10. The method of claim 1 wherein said transform is applied to points in spatial domain, Discrete Cosine transform (DCT) domain, Discrete Fourier transform (DFT) domain, Discrete Wavelets transform (DWT) domain, or any suitable transform domain, or some combination thereof.